Complete Summary

GUIDELINE TITLE

HealthPartners Dental Group guideline for diagnosing and treating endodontic emergencies.

BIBLIOGRAPHIC SOURCE(S)

HealthPartners Dental Group guideline for diagnosing and treating endodontic emergencies. Minneapolis (MN): HealthPartners; 2009 Sep 1. 11 p. [13 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Endodontic emergencies, including traumatic injuries and swelling or pain associated with endodontic pathology

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Risk Assessment
Treatment

CLINICAL SPECIALTY

Dentistry

INTENDED USERS

Dentists

GUIDELINE OBJECTIVE(S)

- To provide guidance to the general dentists in reaching an accurate diagnosis of endodontic conditions (including trauma)
- To provide the necessary care to alleviate pain and infection until definitive care can be provided

TARGET POPULATION

Patients of all ages in the HealthPartners Dental Group with endodontic emergencies and trauma-related conditions

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Evaluation

Evaluation of both pulpal and periradicular status of the tooth or teeth in question:

1. Complete medical and dental history
2. Patient's description of the chief complaint(s)
3. Visual and radiographic examination
4. Thermal, electrical, percussion, palpation and mobility tests
5. Periodontal examination, transillumination and observation of occlusal discrepancies
6. Radiographs of the tooth from more than one angle

Treatment of Traumatic Injuries

Positioning and alignment of teeth in the arch

1. Splinting with a light gauge orthodontic wire and composite bonding or using an elastic material like Protemp without a wire
2. Follow-up visits, including pulp testing and initiating calcium hydroxide therapy when indicated
3. Patient instruction on reimplanting avulsed tooth or transporting tooth

Treatment of Swelling and Pain

1. Systemic antibiotics (penicillin V potassium, amoxicillin, metronidazole, clindamycin)
2. Drainage
3. Calcium hydroxide packing
4. Anesthesia (Stabident system)
5. Pulpectomy for irreversible pulpitis and acute apical periodontitis

6. Complete cleaning and shaping of the root canal system along with using patency files for acute apical abscess

MAJOR OUTCOMES CONSIDERED

- Alleviation of pain
- Absence of infection
- Patient satisfaction
- Volume and type of endodontic referrals

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

An online search from 7/30/2008 to 12/08/2008 was conducted using PubMed and the clinical newsletters of American Association of Endodontists at www.AAE.org.

The search terms used were "treatment of endodontic emergencies" and "formocresol." The "related articles" feature was used to identify additional resources. Sources prior to 1985 were excluded.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Literature was reviewed and discussed by a committee composed of general dentists.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analysis were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guideline was reviewed by non-HealthPartners endodontists.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Endodontic Diagnosis

Endodontic diagnosis requires an evaluation of both pulpal and periradicular status of the tooth or teeth in question.

Begin diagnosis with a complete medical and dental history, the patient's description of the chief complaint(s) and visual and radiographic examination. Some indicated tests such as thermal, electrical, percussion, palpation and mobility should also be accomplished. Periodontal examination, transillumination and observation of occlusal discrepancies may be indicated. In some situations it may be advisable to take radiographs of the tooth from more than one angle.

American Board of Endodontics Pulpal & Periapical Diagnostic Terminology

Pulpal

Normal pulp - A clinical diagnostic category in which the pulp is symptom free and normally responsive to vitality testing.

Reversible pulpitis - A clinical diagnosis based upon subjective and objective findings indicating that the inflammation should resolve and the pulp return to normal.

Irreversible pulpitis - A clinical diagnosis based on subjective and objective findings indicating that the vital inflamed pulp is incapable of healing.

Additional Descriptions

Symptomatic - Lingering thermal pain, spontaneous pain, referred pain.

Asymptomatic - No clinical symptoms but inflammation produced by caries, caries excavation, trauma, etc.

Pulp necrosis - A clinical diagnostic category indicating death of the dental pulp. The pulp is non-responsive to vitality testing.

Previously treated - A clinical diagnostic category indicating that the tooth has been endodontically treated and the canals are obturated with various filling materials, other that intracanal medicaments.

Previously initiated therapy - A clinical diagnostic category indicating that the tooth has been previously treated by partial endodontic therapy (e.g. pulpotomy, pulpectomy).

Apical (Periapical)

Normal apical tissues - Teeth with normal periradicular tissues that will not be abnormally sensitive to percussion or palpation testing. The lamina dura surrounding the root is intact and the periodontal ligament space is uniform.

Symptomatic apical periodontitis - Inflammation, usually of the apical periodontium, producing clinical symptoms including painful response to biting and percussion. It may or may not be associated with an apical radiolucent area.

Asymptomatic apical periodontitis (AAP) - Inflammation and destruction of apical periodontium that is of pulpal origin, appears as an apical radiolucent area and does not produce clinical symptoms.

Acute apical abscess (AAA) - An inflammatory reaction to pulpal infection and necrosis characterized by rapid onset, spontaneous pain, tenderness of the tooth to pressure, pus formation and swelling of associated tissues.

Chronic apical abscess - An inflammatory reaction to pulpal infection and necrosis characterized by gradual onset, little or no discomfort and the intermittent discharge of pus through an associated sinus tract.

Condensing osteitis - A diffuse radiopaque lesion believed to represent a localized boney reaction to a low-grade inflammatory stimulus, seen at the apex of the tooth in which there has been a long-standing pulpal pathosis.

Cracked tooth syndrome - "Cracked tooth" is not a pulpal diagnosis. The signs and symptoms associated with cracks in dentin range from mild pressure sensitivity to an acute apical abscess. A common patient complaint is acute pain on mastication (pressure or release) of grainy, tough foods and sharp, brief pain with cold. These findings are an indication of a dentin crack, and have been characterized as "cracked tooth syndrome." As a dentin crack may present with a variation in signs and symptoms, it should not be termed a syndrome. The use of "cracked tooth" as a pulpal diagnosis should be avoided.

Chief complaint - Pain associated with the pulp can involve irreversible and reversible pulpitis. Periradicular pain may involve an inflamed or necrotic pulp which has led to an acute apical abscess.

Temperature - Hyper-responsiveness to temperature on only one surface of the tooth may relate to exposed dentin in that area and could be the result of abrasion, caries or fracture. Hyper-responsiveness on all surfaces of a tooth may relate to reversible or irreversible pulpitis. If the response is prolonged it is more likely to be irreversible pulpitis. A tooth pulp that is non-responsive to cold is usually necrotic.

Electric pulp test (EPT) - A positive response to EPT is associated with a vital pulp tissue. No response to EPT relates to a necrotic pulp. False negatives may be seen after trauma or in teeth with unformed apices.

Percussion and palpation - Percussion and apical palpation are important tests in determining a periradicular diagnosis. Moderate to severe tenderness usually indicates AAP with a pulpal diagnosis of irreversible pulpitis, or AAA with a pulpal diagnosis of necrotic pulp. Occlusal interferences or prematurities may also produce percussion tenderness.

Periodontal probing - A thorough periodontal examination of the tooth in question should be completed. A tooth may have a questionable to unfavorable prognosis if it is periodontally involved with no endodontic involvement. If a localized deep pocket is found on only one surface of a tooth this may be related to a fracture line running down the root surface of the tooth (endodontic prognosis is unfavorable) or a sinus tract that has formed from a lesion of endodontic origin.

Restorability - Restorability must be assessed before initiating endodontic treatment. Endodontic treatment is contraindicated if the tooth is unrestorable. Restorability usually cannot be determined by viewing the radiograph alone. Caries removal must be completed to determine the restorability of the tooth. When restorability is in question implant therapy should be considered as a treatment option. Restored endodontically treated teeth and single tooth implant restorations have similar rates of success.

Radiographic interpretation - Radiographs can help in determining anatomy of the tooth and pulp along with any pathology present. A periapical radiolucency indicates pulpal pathology only when it can be established that the pulp is non-vital. An endodontic diagnosis cannot be established from a radiograph alone.

Swelling and sinus tracts - These are of endodontic origin alone only when the pulp is non-vital.

Tooth pain may be experienced with conditions of non-endodontic origin:

Organic disorders - Maxillary sinusitis, cysts, tumors, trauma.

Functional disorders - Temporomandibular disorders (TMD)-stress, clenching and bruxism, occlusal disharmonies.

Vascular pain syndromes - Migraine, hypertension, temporal arteritis, craniofacial trauma.

Neurologic disorders - Trigeminal neuralgia.

Psychogenic disorders - Depression, hypochondriasis.

Treatment of Endodontic Emergencies

Traumatic Injuries

In assessing trauma to the mouth, consideration needs to be given to both hard and soft tissues. As a part of an emergency visit, treatment will primarily involve position and alignment of teeth in the arch. At times trauma can cause injury to a tooth without displacing it (concussion) and it is wise to explain possible sequella to the patient (i.e., crushing the neurovascular bundle to the tooth resulting in death of the pulp and the need for endodontic therapy). If teeth have been displaced in the injury, realignment may be achieved with gentle finger pressure. In the case of greater displacement and/or alveolar fracture, the teeth should be realigned and splinted using a light gauge orthodontic wire and composite bonding or using an elastic material like Protemp without a wire. In a situation where a maxillary anterior tooth is severely displaced lingually, the apex of the tooth may be protruding through the labial bone and repositioning of the tooth will involve some initial downward displacement. Follow up visits should entail pulp testing and initiating calcium hydroxide therapy when indicated. Stabilization wires can be removed in two weeks (in the case of minor tooth movement) to eight weeks.

Time is of the essence when treating an avulsed tooth as the prognosis decreases dramatically with time out of the mouth, and it is often best if the patient can be instructed over the phone to rinse off the tooth and replant it immediately. If this is not possible, the patient should be instructed to transport the tooth to the office in a suitable medium such as milk, saline, salvia (buccal vestibule) or Hank's Balanced Salt Solution which may be available at school’s Physical Education Department. The treatment of the avulsed tooth will depend on amount of time out of the socket, the use of a transport media and the degree of root development. If the apex is closed and the extraoral dry time is less than one hour, rinse off with saline and replant immediately. If a clot is present in the socket, use light saline irrigation and if the alveolar bone is fractured, use a blunt instrument to reposition it. Once replanted, the tooth may or may not need stabilization and the patient should be placed on antibiotics, reappointed for calcium hydroxide (CaOH) therapy within two weeks and advised to have their tetanus vaccine updated. Continue CaOH therapy for 6-12 months followed by root canal therapy. When a reimplanted tooth has an open apex and the extraoral

dry time is less than an hour, the patient should be monitored monthly for signs of pathosis or revitalization.

After one hour of desiccation the periodontal ligament (PDL) can be considered necrotic and removed with a curette. Root canal therapy can be performed extraorally and then the tooth should be soaked in a dental fluoride solution for 20 minutes (to slow down the replacement resorption) and replanted. At this point the tooth will ankylose. Replanting an open apex with a long extraoral dry time has a very poor prognosis, and is usually not indicated.

Swelling and Pain

An accurate history is essential in determining the course of treatment for pain and swelling associated with endodontic pathology. Most dental emergencies can and should be treated without the use of systemic antibiotics. When swelling is localized adjacent to a tooth, initiating endodontic therapy and/or surgically draining the purulence is all that is needed. Swelling should always be assessed for the potential to provide drainage of pus, but if the swelling is fast onset and diffuse (cellulitis) the patient should be put on antibiotics and monitored closely. Often there is nothing to drain for several days. Penicillin V potassium (Pen VK) is still the drug of choice for most oral infections. Amoxicillin has a broader spectrum and is a good choice for immunocompromised patients but has an increased likelihood of inducing antibiotic resistance. Adding Metronidazole (500 mg every six hours) to a Pen VK regimen can be very helpful in cases of suspected anaerobic infection that has shown resistance to penicillin alone. Clindamycin (150-300 mg 4 times a day [QID]) is a good substitute for patients who are penicillin allergic.

With an endodontically related infection it is best to establish drainage through the tooth, which requires accessing the pulp and often some instrumentation with a lubricant (RC Prep) through the apex. The tooth can then be left open for 1 or 2 days if active drainage is present or packed with CaOH. If soft tissue swelling is present, effective anesthesia is difficult and the Stabident System will likely be more effective than attempting a nerve block or infiltration alone. (The author finds Stabident to be an important step in achieving anesthesia while treating any "hot" tooth.)

Pain

Reversible Pulpitis - Treat cause if known.

Irreversible Pulpitis - Rarely is it necessary to get out the files with a tooth with an inflamed pulp. Usually just performing a pulpotomy and placing cotton and a 3.5 mm thick temporary is all that is needed. (Cavit® is not sufficiently strong to function as a temporary material in teeth with interproximal involvement.) If you do instrument a vital tooth, then completely instrument it. Partially instrumenting a vital canal will create pulverized tissue tags and even more pain. Do not prescribe antibiotics. If there is acute apical periodontitis, see below.

Necrosis - Treatment dictated by associated periapical pathosis (see below).

Acute Apical Periodontitis - Pulpectomy is the treatment of choice for a tooth with a diagnosis of irreversible pulpitis and AAP since the pulpal tissue is inflamed all the way down to the apex. Patients will continue to have pain with a pulpotomy alone until the apical pulp tissue necroses.

Acute Apical Abscess - (AAA) is probably the most difficult situation to deal with because anesthesia is difficult and pain relief is slow to come with any treatment. In teeth with necrotic pulps, complete cleaning and shaping of the root canal system along with using patency files is the treatment of choice. Leaving the tooth open in cases of active drainage is an option provided the patient can be reassessed within 48 hours. Inform the patient that quick relief isn't probable and that swelling may ensue. Be available to them, as return visits are likely. Antibiotics may be needed if systemic involvement develops.

Chronic Apical Abscess - (CAP) rarely presents as an emergency.

Timing of definitive endodontic care - Most endodontic emergency cases, if appropriately diagnosed and treated, should be stable for four to six weeks. The patient with systemic involvement is an exception, and requires immediate attention.

CLINICAL ALGORITHM(S)

An algorithm for diagnostic and treatment options for endodontic emergencies is provided in the original guideline document.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence supporting the recommendations is not specifically stated.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Careful diagnosis and treatment is essential for a good outcome of endodontic emergencies.
- Using the necessary care to alleviate pain and infection will allow better patient outcome.

POTENTIAL HARMS

Not stated

CONTRAINDICATIONS

CONTRAINDICATIONS

Endodontic treatment is contraindicated if the tooth is unrestorable.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Chart Documentation/Checklists/Forms
Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

HealthPartners Dental Group guideline for diagnosing and treating endodontic emergencies. Minneapolis (MN): HealthPartners; 2009 Sep 1. 11 p. [13 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2009 Sep

GUIDELINE DEVELOPER(S)

HealthPartners Dental Group - Professional Association

SOURCE(S) OF FUNDING

HealthPartners Dental Group

GUIDELINE COMMITTEE

HealthPartners Dentist Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Not stated

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: None available

Print copies: Available from HealthPartners, 8170 33rd Avenue South, P.O. Box 1309, Minneapolis, MN 55440-1309; Phone: (952) 883-5151; Web site: http://www.healthpartners.com

AVAILABILITY OF COMPANION DOCUMENTS

A list of potential measures is available in the original guideline document.

In addition, a form used for diagnosing cases of orofacial pain is available in the original guideline document.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on March 12, 2010. The information was verified by the guideline developer on April 2, 2010.

COPYRIGHT STATEMENT

DISCLAIMER

NGC DISCLAIMER

The National Guideline Clearinghouse™ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at http://www.guideline.gov/about/inclusion.aspx .

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.

Date Modified: 4/19/2010